

Grade 3 Science, Quarter 4, Unit 4.1

Animals

Overview

Number of instructional days: 10 (1 day = 45 minutes)

Content to be learned

- Observe that animals need water, air, food, and shelter/space to survive, grow, and reproduce.
- Identify, sort, and compare based on similar and/or different external features.
- Record and analyze observations and data about external features of animals.
- Cite evidence to draw conclusions, explaining why animals are or are not grouped together.
- Observe changes and record data to scientifically draw and label the stages in the life cycle of a familiar animal.
- Using data or pictures, sequence the life cycle of an animal.
- Given a set of data or pictures, compare the life cycle of two animals.

Science processes to be integrated

- Identify and compare physical characteristics of organisms.
- Sort and classify based on physical characteristics.
- Identify and describe the structures found in a system.
- Describe the functions of the structures found in a system.
- Observe and describe interactions and patterns of change within a system.
- Demonstrate safe and ethical practices during classroom and field investigations.
- Use scientific processes, including making predictions, making and recording observations, citing evidence, collecting and analyzing data, and drawing conclusions.

Essential questions

- What do animals need in order to survive, grow, and reproduce?
- In what ways can animals be sorted and classified?
- What kinds of changes occur throughout the life of an animal?
- What are some similarities and differences between the life cycles of different animals?

Written Curriculum

Grade-Span Expectations

LS1 - All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, and species).

LS1 (K-4) SAE -2

Identify the basic needs of plants and animals in order to stay alive. (i.e., water, air, food, space).

LS1 (3-4)-2 Students demonstrate understanding of structure and function-survival requirements by...

2a ~~observing that plants need water, air, food, light and space to grow and reproduce;~~ observing that animals need water, air, food, and shelter/space to grow and reproduce.

LS1 (K-4) - INQ+POC -1

Sort/classify different living things using similar and different characteristics. Describe why organisms belong to each group or cite evidence about how they are alike or not alike.

LS1 (3-4) –1 Students demonstrate an understanding of classification of organisms by ...

1b identifying, sorting and comparing based on similar and/or different external features.

1c recording and analyzing observations/data about external features (e.g., within a grouping, which characteristics are the same and which are different).

1d citing evidence (e.g., prior knowledge, data) to draw conclusions explaining why organisms are grouped/not grouped together (e.g. mammal, bird, and fish).

LS1 (K-4) POC -3

Predict, sequence or compare the life stages of organisms – plants and animals (e.g., put images of life stages of an organism in order, predict the next stage in sequence, compare two organisms).

LS1 (3-4)–3 Students demonstrate an understanding of reproduction by ...

3a observing changes and recording data to scientifically draw and label the stages in the life cycle of a familiar ~~plant and~~ animal.

3b sequencing the life cycle of ~~a plant~~ or animal when given a set of data/pictures.

3c comparing the life cycles of 2 plants or 2 animals when given a set of data/pictures.

Clarifying the Standards

Prior Learning

In grades K–2, students distinguished between living and nonliving things. They identified and sorted based on similar or different external features, and observed and recorded the external features that make up living things. Students observed that animals need water, air, food, and shelter to grow, and they identified the specific functions of the physical structures of an animal. They observed and scientifically

drew and labeled the stages in the life cycle of a familiar animal, and sequenced the life cycle of an animal when given a set of pictures.

Current Learning

In grade 3, at the reinforcement level to the drill-and-practice level of instruction, students observe that animals need water, air, food, and shelter/space to grow and reproduce. Students identify, sort, and compare animals based on similar and/or different external features, and they record and analyze observations/data about external features of animals. They also cite evidence to draw conclusions, explaining why organisms are or are not grouped together. Students observe changes and record data to scientifically draw and label the stages in the life cycle of a familiar animal, and they sequence the life cycle of an animal when given a set of data or pictures. At the developmental to reinforcement level of instruction, students compare the life cycles of two animals when given a set of data or pictures.

Although students have had prior experiences with many of these concepts, there are some scientific processes that have not been used before with this content. Students learn to analyze their observations and data, and cite evidence in order to draw conclusions. These particular process skills will require additional instruction and guidance from teachers.

In the classroom, it is suggested that students have the opportunity to set up a habitat (shelter) and provide the basic needs (e.g., food, water, air) that would be appropriate for the survival of a living organism (e.g., frog, chick). Students will observe animals' external structures and explain how those structures help them survive in their environment. Students will study the lifecycle of various living organisms firsthand or through pictures, books, and videos. They will also explore the classifications of animals (e.g., mammal, bird, fish) based on observations of external structures and life cycles.

Future Learning

In grade 4, student learning in life science will be focused on the cycling of matter and flow of energy in ecosystems, as well as how organisms show evidence of change over time. Students will demonstrate an understanding of energy flow in an ecosystem by identifying sources of energy for organisms' survival. They will demonstrate an understanding of food webs in an ecosystem by demonstrating in a food web that all animals' food begins with the sun. Students will also use information about organisms to design a habitat and explain how the habitat provides for the needs of the organisms that live there. They will also explain the way that plants and animals in that habitat depend on each other. Students will explain what organisms might do if their environment changes, and they will explain how the balance of the ecosystem can be disturbed.

In grades 5–6, students demonstrate an understanding of biodiversity by recognizing that organisms have different features and behaviors for meeting their needs to survive, and they describe the structures and behaviors that help organisms survive in their environment. Students define reproduction as a process through which organisms produce offspring, and they describe it in terms of being essential for the continuation of a species. They investigate and compare a variety of animal life cycles. Students also identify cells as the building blocks of organisms, and they recognize and illustrate the structural organization of an organism from a cell to tissue to organs to organ systems to organisms.

Additional Findings

According to *Benchmarks for Science Literacy*, students should have the opportunity to learn about an increasing variety of living organisms, and should become more precise in identifying similarities and

differences among them. Although the emphasis can still be on external features, these identifications should be at a finer level of detail. Therefore, students should routinely use hand-lenses when observing animals. As students become increasingly familiar with the characteristics of more and more organisms, they should be asked to invent schemes for classifying them. Hopefully, their classification schemes will vary according to their uses as well as gross anatomy, behavior patterns, habitats, and other features. The aim is to move students toward the realization that there are many ways to classify things, but the quality of any classification depends on its usefulness. A scheme is useful if it contributes either to making decisions on some matter or to a deeper understanding of the relatedness of organisms. Classification schemes will, of course, vary with purpose (*Benchmarks*, p. 103).

Students must learn that organisms have basic needs and they can survive only in environments in which their needs are met. The world has many different environments that support different types of organisms. Each animal has different structures that serve different functions in growth, survival, and reproduction. The behavior of individual organisms is influenced by internal cues (such as hunger) and by external cues (such as a change in the environment). All organisms, including humans, have senses that help them detect internal and external cues (*National Science Education Standards*, p. 129).

Animals have life cycles that include birth, maturation, reproduction, and eventually, death. The details of this life cycle are different for different organisms. Many animals closely resemble their parents. Many characteristics of an organism are inherited from the parents of the organism, but other characteristics result from an individual's interactions with the environment. An organism's patterns of behavior are related to the nature of that organism's environment, including the kinds and numbers of other organisms present, the availability of food and resources, and the physical characteristics of the environment. When the environment changes, some organisms survive and reproduce, and others die or move to new locations (*NSES*, p. 129).

Young children can have difficulty distinguishing between living and nonliving. They tend to use movement, breathing, and death to decide whether things are alive. Students need to understand the multiple attributes that define life—generally, that living things grow, reproduce, and require food, air, water, and space (*Making Sense of Secondary Science*, p. 17).

Notes About Resources and Materials

Books

- *Hands-On Nature: Information and Activities for Exploring the Environment with Children* (Vermont Institute of Natural Science)

Useful Websites

- www.discoveryeducation.com
- http://www.internet4classrooms.com/skills_3rd_science.htm
- www.fossweb.com

Grade 3 Science, Quarter 4, Unit 4.2
Interdependence in Ecosystems

Overview

Number of instructional days: 7 (1 day = 45 minutes)

Content to be learned

- Identify and explain how the physical structure/characteristics of an organism allow it to survive and defend itself.
- Analyze the structures needed for survival of plant and animal populations in a particular habitat/environment.

Science processes to be integrated

- Identify and analyze an organism's structures.
- Explain the relationship between structure and function.
- Collect data and draw conclusions about adaptations/structures that allow organisms to survive.

Essential questions

- How do physical (external) features help plants and animals meet their needs in order to survive in their environments?
- How do the external features of plants and animals allow an organism to defend itself in a particular environment?
- What kinds of structures help populations of organisms survive in a particular habitat or environment?

Written Curriculum

Grade-Span Expectations

LS1 - All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, and species).

LS1 (K-4) FAF –4

Identify and explain how the physical structures of an organism (plants or animals) allow it to survive in its habitat/environment (e.g., roots for water; nose to smell fire).

LS1 (3-4)–4 Students demonstrate understanding of structure and function-survival requirements by...

4a identifying and explaining how the physical structure/characteristic of an organism allows it to survive and defend itself (e.g. of a characteristic – the coloring of a fiddler crab allows it to camouflage itself in the sand and grasses of its environment so that it will be protected from predators).

4b analyzing the structures needed for survival of populations of plants and animals in a particular habitat/environment (e.g. populations of desert plants and animals require structures that enable them to obtain/conserves/ retain water).

Clarifying the Standards

Prior Learning

In grades K–2, students demonstrated an understanding of structure and function-survival requirements by observing that plants need water, air, food, and light, and animals need water, air, food, and shelter to grow. Students also observed and recorded the external features that make up living things, and they identified the specific functions of the physical structures of plants and animals.

Current Learning

At the reinforcement to drill-and-practice level of instruction, grade 3 students identify and explain how the physical structures and characteristics of an organism allow it survive and defend itself (e.g., the coloring of a fiddler crab allows it to camouflage itself in the sand and grasses). They also analyze the structures needed for survival of populations of animals in a particular habitat.

In the classroom, teachers can group students and have each group investigate an ecosystem (desert, polar, rainforest, grasslands). Groups can conduct simple research to identify plant and animal populations specific to that region, and analyze the structures and/or adaptations that allow these groups of organisms to survive in the given ecosystem. Each group can share their research/information with the class so that all students learn about the survival of plants and animals in all regions.

Future Learning

In grade 4, students will demonstrate an understanding of energy flow in an ecosystem by identifying sources of energy for survival of organisms (i.e., light or food). They will demonstrate an understanding

of food webs in an ecosystem by demonstrating a food web where all animals' food begins with the sun. Students will use information about organisms to design a habitat and explain how it provides for the needs of the organisms living there, and explain the way that plants and animals in a habitat depend on each other. Students demonstrate an understanding of equilibrium in an ecosystem by explaining what plants or animals might do if the environment changes, and explaining how the balance of an ecosystem is disturbed.

In grades 5–6, students will demonstrate an understanding of biodiversity by recognizing that organisms have different features and behaviors for meeting their survival needs. They will demonstrate an understanding of structure and function-survival requirements by describing structures or behaviors that help organisms survive in their environment (e.g., defense, obtaining nutrients, and eliminating waste). They demonstrate an understanding of equilibrium in an ecosystem by identifying and defining an ecosystem and the variety of relationships within it (e.g., predator/prey, consumer/producer/decomposer, host/parasite, and catastrophic event).

Additional Findings

During this unit, students build on the understanding that living things need water, food, air, and space/shelter to survive, and that plants need light to survive. For any particular environment, some kinds of plants and animals thrive, and some struggle to survive or do not survive at all (*Atlas of Science Literacy, Vol. 2, p. 33*). Additionally, research tells us that one rule seems to emerge from studies of ecosystems, a rule that follows from the complexity of the web that connects living and nonliving things. It can be simply stated: You can't change just one thing in an ecosystem, because any change has unexpected consequences. In other words, in a complex system it is not always possible to predict what the consequences of any change will be. Seemingly small changes in ecosystems can cause large effects, while huge changes might leave the system pretty much as it was (*Science Matters, p. 328–329*).

According to *Benchmarks for Science Literacy*, students in grade 3 can begin to look for ways in which organisms in one habitat differ from those in another and consider how some of those differences are helpful to survival. The focus should be on the consequences of different features of organisms for their survival and reproduction. By the end of fifth grade, students should know that individuals of the same kind differ in their characteristics, and sometimes the differences give individuals an advantage in surviving and reproducing. (*Benchmarks, p. 123*)

Students in grades 3–5 should have the opportunity to learn about an increasing variety of living organisms, both the familiar and the exotic, and should become more precise in identifying similarities and differences among them. Although the emphasis should still be on external features, finer detail than before should be included. Students should routinely observe living organisms using hand lenses. As students become more familiar with the characteristics of more and more organisms, they should be asked to classify living organisms in different ways. Hopefully, their classification schemes will vary according to gross anatomy, behavior patterns, habitats, and other features. The aim is to move students toward the realization that there are many ways to classify things, but how good any classification is depends on its usefulness. A scheme is useful if it contributes either to making decisions on some matter or to a deeper understanding of the relatedness of organisms. (*Benchmarks for Science Literacy, p. 103*).

Notes About Resources and Materials

Books

Hands-On Nature: Information and Activities for Exploring the Environment with Children (Vermont Institute of Natural Science)

Useful Websites

- <http://library.thinkquest.org/3500/animals.htm> (This website offers the names of plants and animals of specific regions, their features and adaptations.)
- <http://www.discoveryeducation.com/teachers/free-lesson-plans/habitats-of-the-world.cfm>
- http://www.internet4classrooms.com/skills_3rd_science.htm
- www.fossweb.com